

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections is respectfully requested.

This Amendment and Response is in reply to the non-final Office action dated March 23, 2009, setting forth a shortened three-month statutory period for reply with extensions available until September 23, 2009. This Amendment and Response is filed on or before September 23, 2009 with a petition and fee for a three-month extension of time. Accordingly, this Amendment and Response are timely filed.

Claims 1, 3, 5, 8, 9, 13, 16-18, 22-24, 27, 28, 30, 32-34 and 38-56 are pending in the application, with claims 1, 16, 27 and 54 being independent claims. By this Amendment, claims 8, 13, 24, 47-49 and 54 are amended, claims 27, 28, 30, 32-34 and 53 are cancelled and new claims 57 and 58 are added. Accordingly, after entry of this Amendment and Response, claims 1, 3, 5, 8, 9, 13, 16-18, 22-24, 38-52 and 54-58 are pending, with claims 1, 16, 54 and 57 being independent claims.

I. Claim Rejections Under 35 U.S.C. § 112

Claim 16 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For at least the following reasons, the Applicants respectfully traverse this rejection.

The Office Action states that "...in claim 16, the process provides that water is added, then removed forming a residual waste and water mixture. Then the claim calls for preparing a slurry with the waste and water mixture. It is unclear whether this is the same residual water mixture or a fresh supply of water." (Office Action, page 2).

Applicants refer to Claim 16, which states, in part, "...providing a mixture of the waste and water; removing a select amount of water from the waste and water mixture to form a residual waste and water mixture; preparing a slurry comprising the residual waste and water mixture, an oxide binder and a phosphate binder..."

As can be understood from claim 16, a select amount of water is removed from the waste and water mixture to form a residual waste and water mixture. Then, a slurry comprising the residual waste and water mixture, an oxide binder and a phosphate binder is prepared. Thus, the residual waste and water mixture of the removing process is the same residual waste and water mixture in the preparing process.

Reconsideration and withdrawal of the rejection are respectfully requested.

II. Claim Rejections Under 35 U.S.C. § 102

Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 6,153,809 issued to Singh (hereinafter "Singh"). For at least the following reasons, the Applicants respectfully traverse the rejection.

1. Singh does not teach a "method of stabilizing a waste in chemically bonded phosphate ceramic comprising...removing bound water from the solid hydrated chemically bonded phosphate ceramic matrix."

Singh teaches modification of "known CBPC [chemically bonded phosphate ceramic] encapsulation techniques and products to include a unique immobilization step that specifically addresses problems...due to the presence of soluble salt anions in the waste stream." (col. 6, ll. 27-31). Specifically, Singh teaches applying a polymer coating to "the exterior surface of the CBPC product to infiltrate the complex surface structure of the CBPC product and bond and/or adhere thereto, such that salt waste is effectively macro-encapsulated within phosphate ceramic matrix and isolated from the environment." (col. 6, ll. 31-36).

Thus, Singh is concerned with selection and application of a polymer coating to known CBPC encapsulation techniques in order to effectively contain wastes having a high concentration of salt. Singh provides no teaching related to a process performed on or to the CBPC after it is cured to form a solidified ceramic matrix except subjecting the CBPC waste products to variance performance tests. (col. 9, ll. 8-11). Further, Singh describes passive evaporation of water while the CBPC is being cured to form a solid. (col. 2, ll. 29-32; col. 9, ll. 2-11). Singh is thus describing passive removal of the water during the curing process instead of removing water after the CBPC is solidified as recited in claim 1. Singh is not concerned with, and therefore does not teach, removing bound water from the solid hydrated chemically bonded phosphate ceramic matrix. Because Singh does not teach every aspect of the presently claimed method, Singh does not anticipate the presently claimed method or the claims that depend therefrom. Reconsideration and withdrawal of the rejection are respectfully requested.

III. Claim Rejections Under 35 U.S.C. § 103

A. Claims 1, 16, 17, 18, 24 and 52 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Pat. No. JP 63015200 to Mitsubishi (hereinafter "Mitsubishi"). For at least the following reasons, the Applicants respectfully traverse the rejection.

Mitsubishi teaches treatment of radioactive waste boric acid liquid by concentrating it and mixing it with phosphoric acid and an alkali metal or an alkali metal salt of phosphoric acid to create a mixture. The mixture is heated to remove water and water of crystallisation to form a calcined body. The calcined body is then heated to temperatures above 600 deg. C to form phosphate glass. (Abstract). As explained in more detail below, Mitsubishi does not teach every element of independent claims 1 and 16, and therefore does not teach every element of the claims that depend therefrom.

As to claim 1, Mitsubishi provides no teaching related to removing bound water from a solid hydrated chemically bonded phosphate ceramic matrix. Mitsubishi merely teaches removing water from a mixture that is maintained in a liquid phase state (see Mitsubishi translation at page 4, first full paragraph). There is no teaching related to removing bound water from a hydrate solid. Absent a teaching related to removing bound water from a hydrate solid, Mitsubishi cannot provide a reasonable expectation of success that bound water could be removed from a hydrate solid using its methods. Accordingly, Mitsubishi does not teach every element of claim 1.

As to claim 16, the Examiner admits that Mitsubishi does not teach first removing water and then adding the oxide binder and the phosphate binder prior to allowing the slurry to cure. (Office Action, page 4). However, the Examiner states "it would have been obvious to one of ordinary skill in the art at the time of the invention to heat the solution to remove water prior to adding the oxide and phosphate mixture because phosphate solidifies at a lower temperature. Therefore, it would be obvious to remove excess water prior to adding the phosphate because it would be easier to do so prior to when it hardens." The Applicants respectfully disagree. Contrary to the Examiner's suggestion, there is no indication from Mitsubishi that the reaction could occur if water was removed prior to adding the oxide and phosphate binders. If too much water is removed, the reaction may not occur. Moreover, there is no teaching in Mitsubishi that indicates how much water could be removed yet still ensure that the reaction could occur. Thus, one of skill in the art could not have a reasonable expectation of success that the reaction would occur if water was removed prior to adding the oxide and phosphate binders.

Accordingly, Mitsubishi does not teach every element of claim 16, and accordingly cannot teach all elements of claims 17, 18, 24 and 52 that depend therefrom.

Reconsideration and withdrawal of the rejections of claims 1, 16-18, 24 and 52 is respectfully requested.

B. Claims 3, 8, 38, 39 and 49 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh, and further in view of U.S. Pat. No. 5,645,518 to Wagh (hereinafter "Wagh"). For at least the following reasons, the Applicants respectfully traverse the rejections.

Claims 3, 8, 38, 39 and 49 depend from claim 1. As explained previously, Singh teaches a polymer coating that is applied to the surface of a phosphate ceramic composite to effectively immobilize soluble salt anions encapsulated within the phosphate ceramic composite.

(Abstract) Thus, Singh is creating a ceramic composite and coating it with a polymer. Singh is not concerned with and does not teach a dewatering step following solidification of the ceramic matrix as described in more detail above. Accordingly, Singh does not teach all elements of claims 1 and therefore does not teach the claims that depend therefrom.

With respect to independent claim 1 and the claims depending therefrom, Wagh does not make up for the failings of Singh. Wagh teaches a room temperature method of forming a ceramic material for stabilizing low level wastes. (col. 1, ll.13-14). Wagh provides no teaching of further processing the cured ceramic matrix to remove bound water from the solid hydrated ceramic matrix. The only teaching of such processing is provided by the present application. Accordingly, Wagh does not teach all elements of claim 1 and therefore does not teach the all elements of claims 3, 8, 38, 39 and 49 that depend therefrom.

Reconsideration and withdrawal of the rejections of claims 3, 8, 38, 39 and 49 are respectfully requested.

C. Claims 41, 43, 44, 45, 46, 47 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mitsubishi, and further in view of Singh and Wagh. For at least the following reasons, the Applicants respectfully traverse the rejection.

Claims 41, 43-48 depend from claim 1. For the reasons stated above in subsections A and B with respect to claim 1, Mitsubishi does not teach removing bound water from a solid hydrated chemically bonded phosphate ceramic matrix. Mitsubishi merely teaches removing water from a mixture that is maintained in a liquid phase state (see Mitsubishi translation at

page 4, first full paragraph). There is no teaching related to removing bound water from a hydrate solid.

Singh and Wagh do not make up for the failings of Mitsubishi. As discussed in more detail above, neither Singh nor Wagh teach dewatering a solid hydrate ceramic matrix.

Accordingly, the combination of Mitsubishi with Singh and Wagh does not teach claim 1 and therefore cannot teach the claims that depend therefrom, namely, 41, 43, 44, 45, 46, 47 and 48. In addition, for the reasons stated above, one of skill in the art would not have a reasonable expectation of success for removing bound water from a solid hydrate based on the teachings of Mitsubishi, Wagh and Singh. Mitsubishi teaches removing water during a liquid phase state and Wagh and Singh are not concerned with removing water from a solid hydrate. Thus, they provide no reasonable expectation of success for removing bound water from a solid hydrate.

Reconsideration and withdrawal of the rejections of claims 41, 43, 44, 45, 46, 47 and 48 are respectfully requested.

D. Claims 5, 40, 42, 54 and 56 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh or Mitsubishi, and further in view of Japanese Pat. No. JP 2002131481 to Sato (hereinafter "Sato"). For at least the following reasons, the Applicants respectfully traverse the rejection.

Claims 5, 40 and 42 depend from claim 1. Neither Singh nor Mitsubishi teaches removing bound water from a solid hydrated chemically bonded phosphate ceramic matrix. For at least this reason, neither Singh nor Mitsubishi teaches every element of claim 1 and therefore cannot teach all elements of the claims that depend therefrom. Sato does not make up for the failings of either Singh or Mitsubishi. As stated by the Examiner, Sato teaches a method of handling a waste sludge by first dehydrating the sludge then solidifying in cement with varying chemical compositions. (Office Action, page 11). Sato provides no teaching related to ceramic and no teaching related to removing bound water from a solid hydrated chemically bonded phosphate ceramic. Accordingly, Singh or Mitsubishi, in combination with Sato, does not teach claim 5, 40 or 42.

With respect to independent claim 54 and its dependent claim 56, neither Singh nor Mitsubishi teaches driving off bound water from the solid chemically bonded phosphate ceramic matrix to form a solid matrix having reduced weight. For at least this reason, neither Singh nor Mitsubishi teaches every element of claim 54 and therefore cannot teach all elements of the

claims that depend therefrom. Sato does not make up for the failings of either Singh or Mitsubishi. As stated by the Examiner, Sato teaches a method of handling a waste sludge by first dehydrating the sludge then solidifying in cement with varying chemical compositions. (Office Action, page 11). Sato provides no teaching related to ceramic and does not teach driving off bound water from the solid chemically bonded phosphate ceramic matrix to form a solid matrix having reduced weight. Accordingly, Singh or Mitsubishi, in combination with Sato, does not teach claim 54 or 56.

In addition, for the reasons stated above, one of skill in the art would not have a reasonable expectation of success for removing bound water from a solid hydrate (claim 1) or driving off bound water from the solid chemically bonded phosphate ceramic matrix to form a solid matrix having reduced weight (claim 54) based on the teachings of Mitsubishi, Singh or Sato. Mitsubishi teaches removing water during a liquid phase state and Singh is not concerned with removing water from a solid or a solid hydrate. Sato's teachings are related to cement, not ceramic, and further are not related to removing water from a solid ceramic matrix. Further, in cement, water is a binding agent. With respect to ceramic, water may act like a catalyst for dissolution/reaction to form the ceramic, but the water does not act as a binding agent. Thus, the references, in combination, provide no reasonable expectation of success for removing bound water from a solid hydrate or for driving off bound water from the solid chemically bonded phosphate ceramic matrix to form a solid matrix having reduced weight.

Reconsideration and withdrawal of the rejections of claims 5, 40, 42, 54 and 56 are respectfully requested.

E. Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh or Mitsubishi, and further in view of U.S. Pat. No. 5,653,872 to Cohan (hereinafter "Cohan"). For at least the following reasons, the Applicants respectfully traverse the rejection.

Claim 8 is dependent upon claim 1. Neither Singh nor Mitsubishi teaches removing bound water from a solid hydrated chemically bonded phosphate ceramic matrix. For at least this reason, neither Singh nor Mitsubishi teaches every element of claim 1 and therefore cannot teach all elements of the claims that depend therefrom. Cohan does not make up for the failings of either Singh or Mitsubishi. Cohan teaches a process for producing free-flowing solid material from an aqueous sludge waste composition that includes mixing the sludge with previously dried solids, pelletizing the composition to form strand-like material, drying the outside layer of the strand-like material, and drying the partially dried material by contacting with

heated gas. (Abstract). This is not removing bound water from a solid hydrated chemically bonded phosphate ceramic matrix. Accordingly, neither Singh nor Mitsubishi, in combination with Cohan teaches all elements of claim 1 or its dependent claim 8. Reconsideration and withdrawal of the rejection are respectfully requested.

F. Claims 9 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh or Mitsubishi and Cohan, and further in view of Wagh. For at least the following reasons, the Applicants respectfully traverse the rejection.

Claims 9 and 13 are ultimately dependent upon claim 1. As explained above in at least subsections A-C and E, Singh or Mitsubishi and Cohan, in combination with Wagh do not teach all elements of claim 1 and accordingly, cannot teach all elements of claims that depend therefrom. Reconsideration and withdrawal of the rejection of claims 9 and 13 are respectfully requested.

G. Claims 22, 23, 51 and 55 depend from one of the independent claims 1, 16 and 54. Claims 22, 23, 51 and 55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mitsubishi, Wagh and/or Singh, in some combination with other references (Sato, Francis, 2003/0131759 ("Francis") and/or Wagh and Grover, "Chemically Bonded Phosphate Ceramics II. Warm-Temperature Process for Alumina Ceramics", ("Grover")).

Claims 22 and 23 depend from claim 16. For at least the reasons stated above, Mitsubishi and Wagh do not teach all elements of independent claim 16 and accordingly, cannot teach all elements of the claims that depend therefrom, namely claims 22 and 23. Francis is not cited for and does not make up for the failings of Mitsubishi and Wagh. Francis teaches a composite material comprising a reaction product of metal oxide, phosphate, reactive residual material and water. (paragraph 11). Francis does not teach first removing water from the waste and water mixture to form a residual waste and water mixture and then preparing a slurry comprising the waste and water mixture, an oxide binder and the phosphate binder, all added prior to allowing the slurry to cure. Accordingly, Mitsubishi, Wagh and Francis, in combination do not teach all elements of claim 16, and therefore do not teach all elements of claims 22 and 23.

Claim 51 ultimately depends from claim 1, and claim 55 depends from claim 54. For at least the reasons stated above, Singh and Wagh do not teach all elements of independent claim 1 and accordingly, cannot teach all elements of the claims that depend therefrom, namely claim

51. Similarly, Singh or Mitsubishi and Sato do not teach all elements of independent claim 54 and accordingly, cannot teach all elements of the claims that depend therefrom, namely claim 55. Grover is not cited for and does not make up for the failings of Singh, Wagh, Mitsubishi and Sato. Grover teaches the solidification of chemically bonded phosphate ceramics between the temperature of 100-150 degrees Celsius. (Abstract). Grover does not teach removing bound water from a solid hydrated chemically bonded phosphate ceramic matrix as required in claim 1 or driving off bound water from the solid chemically bonded phosphate ceramic matrix to form a solid matrix having reduced weight as required in claim 54. Accordingly, Singh, Wagh and Grover, in combination, do not teach all elements of claim 1 and Singh or Mitsubishi and Sato and Grover do not teach all elements of claim 54, and therefore these combinations of references do not teach all elements of their respective dependent claims 51 and 55.

Reconsideration and withdrawal of the rejections of claims 22, 23, 51 and 55 are respectfully requested.

IV. Amendments to claims 8, 13, 24, 47-49 and 54

Applicants note that several of the original and previously presented claims included the phrase "at least one of: X, Y and Z" or a similar variation. Based on current case law (see SuperGuide Corp v. DirecTV Enterprises Inc., 358 F3d 870 (Fed. Cir. 2004)), such a phrase is interpreted to be a conjunctive list. That is, the phrase is interpreted as requiring at least one of X, and one of Y and one of Z. Applicants intended the claim scope of such claims to be: at least one of X or one of Y or one of Z. Accordingly, claims including this phrase have been amended based on the current interpretation of this phrase and not for patentability purposes.

V. New claims 57 and 58

Support for new claims 57 and 58 may be found in the published application at, for example, paragraphs 45, 53 and 56. Accordingly, the Applicants respectfully submit that no new matter has been added.

Applicants respectfully submit that none of the references cited by the Examiner, either alone or in combination, teach all elements of new independent claim 57 or its dependent claim, claim 58. As explained above with respect to independent claim 1, Mitsubishi, Singh and/or Wagh do not teach removing bound water from the solid chemically bonded phosphate ceramic matrix. Further, Cohan, Sato, Francis and Grover do not compensate for the failings of Mitsubishi, Singh and/or Wagh because these references also do not teach removing bound

water from the solid chemically bonded phosphate ceramic matrix. Accordingly, the references, either alone or in combination, do not teach all elements of claim 57 and accordingly, cannot teach all elements of the claim that depends therefrom, namely claim 58.

For at least the foregoing reasons, the Applicants respectfully submit that the new claims are supported by the specification and allowable over the cited references. Accordingly, the Applicants respectfully request that the Examiner enter new claims 57 and 58 and indicate them as allowable.

CONCLUSION

After entry of the above listing of claims and remarks, claims 1, 3, 5, 8, 9, 13, 16-18, 22-24, 38-52 and 54-57 remain in the application. In accordance with the amendments and arguments set forth herein, the Applicants respectfully submit the application and all claims are in a condition for allowance, and request such prompt allowance.

This Amendment and Response is filed with a Petition for a three-month Extension of Time and a request to charge Deposit Account No. 04-1415 for the extension of time fee in the amount of \$1,110.00. The Applicants believe no further fees or petitions are due with this filing. However, should any such fees or petitions be required, please consider this as authorization therefor and please charge such fees to Deposit Account number 04-1415.

Should any issues remain that the Examiner believes may be dealt with in a telephone conference, the Examiner is invited to contact the undersigned at 303-629-3400.

Dated this 23rd day of September, 2009.

Respectfully submitted,



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